
CHAPTER IV I

Los Banos Wildlife Management Area Alternative Plans



U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
MID-PACIFIC REGION

CHAPTER IV I

LOS BANOS WILDLIFE MANAGEMENT AREA

Los Banos Wildlife Management Area (WMA) was originally called the Los Banos State Game Refuge and was the first in a series of waterfowl refuges established throughout California. This refuge was created by DFG drought conditions on the nesting grounds in the latter part of the 1920's caused waterfowl populations in the Pacific Flyway to reach a low ebb. The DFG continues to manage the refuge. The refuges were established to aid in restoring duck and goose populations by providing habitat and protection from hunting. The 3,200 acre Los Banos WMA was purchased in 1929.

The refuge is located approximately four miles northeast of the City of Los Banos. The refuge is centrally located in the San Joaquin River floodplain and is included within the Grassland Resource Conservation District, as discussed in Chapter IV G of this report. These wetlands are the remnants of a much larger seasonal wetlands complex that historically extended throughout the Central Valley. Los Banos WMA is also included within the Los Banos Complex of wildlife areas as discussed in Chapter IV H. The management of the Los Banos WMA is oriented primarily toward the maintenance of native marsh habitat (USBR, 1986a).

A. WATER RESOURCES

Estimated annual water requirements and the existing firm water supply for the Los Banos WMA are 25,000 acre-feet and 6,200 acre-feet, respectively, as presented in Table IV G-2. Present sources of dependable water supply to Los Banos WMA are 2,200 acre-feet from Grassland Water District distributed through the San Luis Canal, and 4,000 acre-feet from the San Pedro and West Delta Canals supplied through an exchange contract with Reclamation. The San Pedro and West Delta Canals are San Luis Canal Company (SLCC) facilities. The Boundary Drain supplies 6,500 acre-feet. Table IV I-1 lists quantities and sources of water deliveries.

1. Surface Waters

The Grassland Water District (GWD) delivers the 2,200 acre-feet of dependable water in the winter. Approximately 1,400 acre-feet of water can be delivered between September 15 and November 1. The remaining 800 acre-feet can be delivered between November 1 and December 31.

Riparian water rights exist for 2,000 acre-feet of Mud Slough water, however water quality has deteriorated due to agricultural return water. This water is not acceptable for wildlife purposes.

TABLE IV I-1
WATER DELIVERIES
LOS BANOS WMA
(acre-feet)

Year	Grassland (a) Water District		Exchange Contract	Boundary Drain	Mud Slough Riparian Rights	Total
	Winter Water	Summer Water				
1977	1,700	2,160	7,283	1,000	750	12,893
1978	2,200	2,160	3,995	6,500	2,000	16,855
1979	2,200	2,160	3,995	6,500	2,000	16,855
1980	2,200	2,160	3,995	6,500	2,000	16,855
1981	2,200	2,160	3,995	6,500	2,000	16,855
1982	2,200	2,160	3,995	6,500	2,000	16,855
1983	2,200	2,160	3,995	6,500	2,000	16,855
1984	2,200	2,160	3,995	6,500	2,000	16,855
1985	2,200	0	3,995	6,500	2,000	14,695
1986	2,200	0	3,995	6,500	0	15,195 ^(b)

(a) Includes 2,000 acre-feet of groundwater

(b) Includes 2,500 acre-feet of Bureau solicitors opinion water

Sources: USBR, 1986a; USFWS, 1986h

The exchange contract provides for water rights lost from the San Joaquin River and is delivered free of charge between March and December. The water obtained from the SLCC by the exchange contract and the winter GWD water is high-quality CVP water. The San Luis Canal currently carries agricultural return water which is too concentrated to be utilized. The Porter-Blake Bypass has been constructed to divert unusable agriculture return flows which enter the southern portion of Grassland Water District at Camp 13 and the Agatha Canal into Mud Slough. This bypass allows freshwater deliveries to be made via the San Luis Canal into Los Banos WMA.

Boundary Drain water originates as agricultural return flows from neighboring lands. The availability of this water for refuge use depends on water use and conservation by neighboring water districts. The seasonal fluctuations of the current water supply have been accommodated for in the management of the refuge. Water from the Boundary Drain is of poorer quality than the CVP water supplies due to salts but has been low in selenium.

2. Water Conveyance Facilities

As discussed previously, the San Pedro and West Delta Canals are SLCC facilities. An abandoned ditch of the West Delta system has not been used for over thirty years, but could be an alternate delivery point in the future (DFG, 1987d).

The Boundary Drain is a deep agricultural drain which enters the refuge from the southeast. This is the primary water source for the east-central portion of the refuge and can also supply water to the remainder of the refuge, except for the southern area. The Boundary Drain water is no longer used on the west side of Los Banos WMA. The water is lowlifted and piped across private land to the eastern area of the refuge. At one time, Boundary Drain/Mud Slough water was lowlifted into the Ruth Lakes at the north end of Lower Ruth Lake; the water was then lifted from the lakes to supply water to the southeast area of the refuge. The SLCC has dredged the Boundary Drain/Mud Slough three feet deeper than the original depth and removed all structures in the ditch; water can not always be backed to the lowlift pumps (DFG, 1987d).

Mud Slough is a natural drain that flows through the area joining Boundary Drain at the middle of the refuge. At times Mud Slough has heavy flows and could be used to create ponds through the western sections. Recent studies show a high selenium load in Mud Slough so at present this water should not be held on the refuge until the water quality improves (DFG, 1987d). The Porter-Blake Bypass transfers the concentrated drain water from Arroyo Canal into Mud Slough so that the Santa Fe Canal and the San Luis Canal can be used north of the bypass.

The main source of water to the west side of Los Banos WMA has been the San Luis Canal as shown on Figure IV I-1. Several delivery points along the western boundary of the

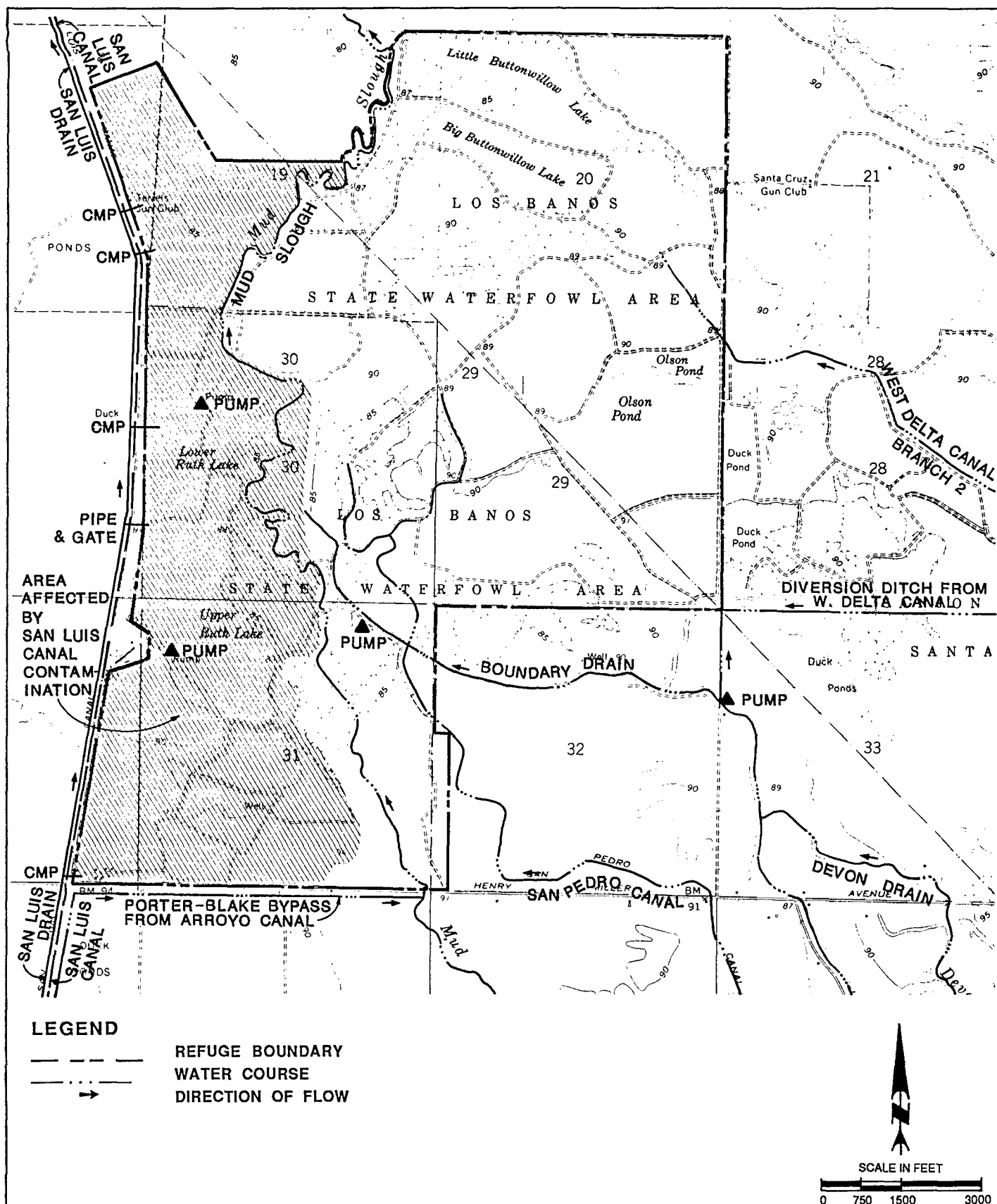


FIGURE IV I-1

LOS BANOS WILDLIFE MANAGEMENT AREA
EXISTING WATER SUPPLY FACILITIES



refuge have supplied water from the Canal to the lakes and marsh areas west of Mud Slough. This system provides an adequate means for water delivery to the west side provided the water delivered is of acceptable quality.

The eastern area of the refuge is served through the SLCC's San Pedro Canal Systems and the Boundary Drain. The source of this entire system is the Arroyo Canal which receives usable drain water from the GWD. Currently the conveyance systems on the east side do not have adequate capacity. The West Delta Canal can transport approximately 10 cfs, while the San Pedro Canal can deliver 15 to 20 cfs. A 20 cfs pump lifts water from the Boundary Drain north for delivery to the southeast-central corner of the refuge. This system can only be used if acceptable quality drain water is flowing in the Boundary Drain. The source of this entire system is the San Luis Canal Company. Problems conveying water to the refuge may occur every 4 or 5 years from November 15 to January 15 when the Mendota Pool is drawn down for maintenance. This drawdown prevents delivery of some of the water available to the refuge under the exchange contract.

Capacity of the east side conveyance systems, West Delta and San Pedro Canals and the Boundary Drain, is limited. Another reason for lack of capacity is related to maintenance of the 50-year old canal and ditch system.

3. Groundwater

Groundwater levels are generally within 25 feet of the land surface and experience small seasonal fluctuations. Los Banos WMA has similar geologic conditions as the GWD, as described in Chapter IV G of this report. Please refer to that section for information pertaining to the general groundwater conditions.

In 1981, a small dam was removed from Boundary Drain which caused the groundwater level to drop due to decreased seepage. This lowering of the water level resulted in a 33 percent increase in refuge water requirements (USBR, 1986a).

Historically Los Banos WMA has used five groundwater pumps. High power costs, well cave-ins, and poor water quality due to high boron content have caused the groundwater system to be abandoned. The Reclamation estimates that a safe pumping capacity of 6,800 acre-feet could be delivered from a 60 horsepower pump installed in a 500-foot well (USBR, 1986c).

B. FORMULATION AND EVALUATION OF ALTERNATIVE PLANS

In the past, wildlife areas have relied upon surplus surface water, agricultural return water, and groundwater for meeting water needs. To provide for full development of the refuge, the annual water requirement is 25,000 acre-feet per year. However, for the purposes of assessing the impacts of water

delivery alternatives, four levels of water supply have been identified and are presented in Table IV I-2. Each of the water supply levels provide a different rate and volume of water, summarized as follows:

- Level 1 - Existing firm water supply
- Level 2 - Current average annual water deliveries
- Level 3 - Water supply needed for full use of existing development
- Level 4 - Water delivery needed for optimum management

Multi-objective project evaluation procedures, in accordance with concepts outlined by the Water Resources Council, is one of the tools used in evaluating and comparing alternatives. The Water Contracting EIS's will evaluate the national, regional, and site-specific environmental impacts of providing water to the refuges and other users under the different water supply levels. Based on the results of the Water Contracting EIS's, water supply levels will be identified for each refuge. Following completion of the Water Contracting EIS's, the plans to meet the identified water level will be compared under the National Economic Development Account, Environmental Quality Account, and Social Account.

The beneficial and adverse effects of each alternative to provide additional water to the refuge also were compared with respect to many criteria. A summary comparison of the alternatives to provide additional water to the refuge for the Water Supply Levels 1,2,3, and 4 is presented in Table IV I-3.

The following delivery alternatives have been developed to convey the identified levels of water supply described above.

1. Delivery Alternative for Level 1 (No Action Alternative)

Since this level represents the existing firm water supply, minimum construction and/or the use of existing facilities is required to provide a dependable conveyance system for the refuge.

Alternative A - Convey water under the Zahm-Sansoni Plan. Under this alternative, the San Luis Canal, as reconfigured under the Zahm-Sansoni Plan (see Chapter IV G), would be utilized to deliver water to the west side of the Los Banos WMA using the GWD facilities.

Alternative B - Implement a Conjunctive Use Program. Groundwater could be used during an emergency in conjunction with surface water at times when the Mendota Pool is drawn down and the CCID cannot transport an adequate amount of water. Conjunctive Use plan is defined in Chapter II. The groundwater could be mixed with surface water to reduce the boron concentrations. Wells should be constructed around existing internal conveyance facilities, namely the Boundary Drain and the San Luis Canal.

TABLE IV I-2
DEPENDABLE WATER SUPPLY NEEDS
ALTERNATIVE SUPPLY LEVELS FOR THE LOS BANOS WMA

Month	Supply Level 1		Supply Level 2		Supply Level 3		Supply Level 4	
	ac-ft	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft	cfs
January	200	3.3	500	8.1	500	8.1	500	8.1
February	0	0.0	500	9.0	500	9.0	500	9.0
March	0	0.0	1,000	16.3	1,000	16.3	1,500	24.4
April	0	0.0	1,000	16.8	1,000	16.8	1,500	25.2
May	700	11.4	2,000	32.5	3,000	48.8	3,000	48.8
June	500	8.4	1,500	25.2	4,000	67.2	4,000	67.2
July	0	0.0	1,500	24.4	3,000	48.8	3,000	48.8
August	0	0.0	1,670	27.2	2,000	32.5	2,500	40.7
September	1,500	25.2	2,000	33.6	2,000	33.6	2,500	42.0
October	2,000	32.5	3,000	48.8	3,000	48.8	3,000	48.8
November	1,000	16.8	1,500	25.2	1,500	25.2	2,000	33.6
December	300	4.9	500	8.1	1,000	16.3	1,000	16.3
Total	6,200	102.5	16,670	275.2	22,500	371.4	25,000	412.9
Maximum	2,000	32.5	3,000	48.8	4,000	67.2	4,000	67.2

Notes:

- Alternative 1 Existing firm water supply
- Alternative 2 Current average annual water deliveries
- Alternative 3 Full use of existing development
- Alternative 4 Optimum management

Sources: USBR, 1986a; CDFG, 1986c; USFWS, 1986g

TABLE IV I-3
SUMMARY COMPARISON OF WATER DELIVERY ALTERNATIVES
LOS BANOS WMA

	Supply Levels 1, 2, 3 & 4		
	Alternative A	Alternative B	Alternative C
Availability of Water Supply	Yes	Yes	Maybe
Ability to Convey Water	Most of Year	Most of Year	Most of Year
Need New Water	Yes	Yes	Yes
Need New Conveyance Agreements	Yes	No	Yes
Type of Water Supply	Fresh Water	Groundwater & Fresh Water	Ag. Return Flows Blended with Fresh Water
Operational Flexibility	Good	Good	Fair
Wildlife Habitat	Improve	Improve	Improve
Public Use	Increase	Increase	Increase
Total Annual Costs (\$) ^(a)	126,950	95,990	30,980

Notes: Alternative A: Zahm-Sansoni Plan.
Alternative B: Conjunctive Use Program.
Alternative C: Rehabilitate CCID facilities.

(a) Total Annual Costs includes annualized construction cost, annual operation and maintenance cost, annual power and wheelage cost.

Alternative C - Reconstruct SLCC Facilities. The SLCC facilities could be utilized to convey agricultural return water blended with or without CVP water after upgrading portions of the West Delta and San Pedro Canals and Boundary Drain. An old diversion ditch shown on Figure IV I-2, located 7,500 feet from the West Delta Canal to the southeast corner of the Los Banos WMA, would be reconstructed also.

2. Delivery Alternative for Level 2

Water Level 2 can be accommodated with the delivery alternatives for Level 1.

3. Delivery Alternative for Level 3

Water Level 3 can be accommodated with the delivery alternatives for Level 1.

4. Delivery Alternative for Level 4

Water Level 4 can be accommodated with the delivery alternatives for Level 1.

5. Summary of Alternatives

Alternatives A, B, and C are the alternatives for implementation of Levels 1, 2, 3, and 4. As discussed in Chapter IV G of this report, Alternative A, the conveyance of water under the Zahm-Sansoni Plan would benefit this refuge as well as others in the vicinity. Alternative B would require the construction of wells within the refuge and the blending of water to improve the water quality. Operation costs would be high with this alternative. Alternative C would require reconstruction of San Luis Canal Company facilities. These reconstruction activities may have impacts to the riparian communities. The costs of maintaining these facilities would also be high.

C. COSTS AND ECONOMIC ANALYSIS

Costs for the alternative plans for providing adequate water supplies under Water Supply Levels 1, 2, 3, and 4 are presented in Table IV I-4 and the Cost Estimating Appendix. The construction costs include factors to cover engineering, contingencies, and overhead. During the advanced planning phase, these costs will be refined further.

Construction of the improvements under the various delivery alternatives would result in additional money being spent in Merced County during construction. The construction could be completed within one summer season by construction workers who reside in Merced, Madera or Fresno County.

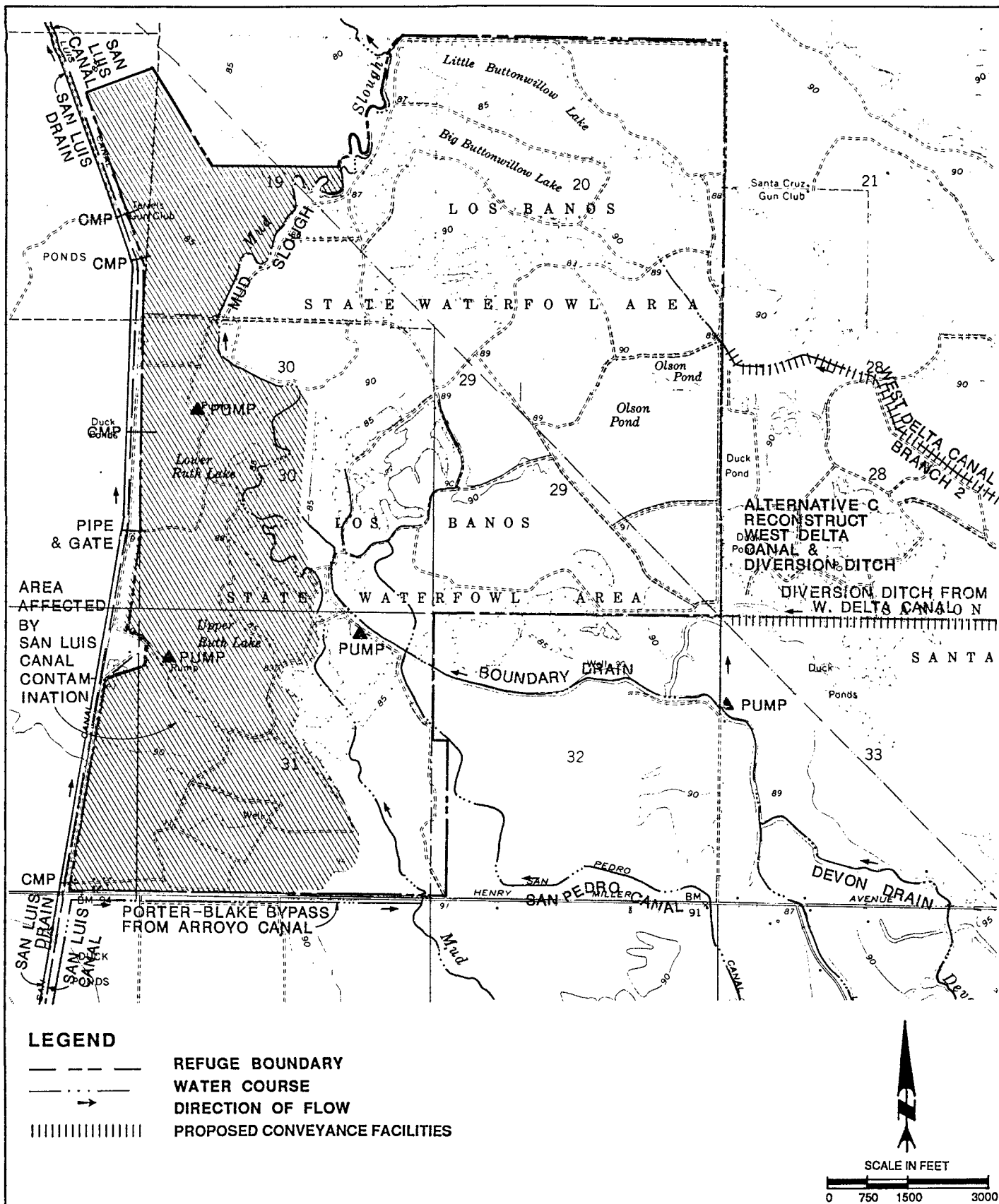


FIGURE IV I-2

LOS BANOS WILDLIFE MANAGEMENT AREA

**PROPOSED WATER SUPPLY FACILITIES
ALTERNATIVE C**

JMM

TABLE IV I-4
SUMMARY OF ESTIMATED COSTS OF ALTERNATIVES
LOS BANOS WMA

Items	Water Delivery Levels 1, 2, 3, & 4 Alternatives		
	A	B	C
Total Constructions Costs	\$1,000,000	\$212,000	15,300
Power Costs (\$/acre-foot)	0.00	10.00	0.00
Water Wheeling Costs (\$/acre-foot)	1.15	0.00	1.15
Annualized Construction Costs (8.875%, 30 years)	96,200	20,390	1,470
Annual Operations & Maintenance Costs	2,000	7,600	760
Annual Power Costs	0	68,000	0
Annual Water Wheelage Costs	28,750	0	28,750
Total Annual Costs	\$ 126,950	\$ 95,990	\$ 30,980

Alternative A - Convey Water under the Zahm-Sansoni Plan (Siphon Construction)

Alternative B - Conjunctive Use

Alternative C - Reconstruct SLCC Facilities

Currently (Level 2), the annual public use to Los Banos WMA is about 3,500 consumptive, and 20,000 non-consumptive use-days per year. If water is provided throughout the year, the attendance levels would increase, but not significantly.

D. WILDLIFE RESOURCES

The annual waterfowl use in the Los Banos WMA is approximately 13,252,000 use-days for ducks and 1,800,000 use-days for geese. Records are not available for other waterbirds. Wildlife and fishery resources associated with the refuge are presented in Table IV I-5. There are no listed threatened or endangered species at the Los Banos WMA. Numerous candidate species may occur in this area and are presented in Table IV I-6.

The plan under water delivery Level 4 would provide an additional 18,800 acre-feet of water over the course of the year to improve habitat in the refuge. The improved habitat would increase the number of wildlife use days and recreational benefits as presented in Table IV I-7.

Implementation of any of the alternative plans would not adversely effect the listed and candidate threatened and endangered species of birds. Detailed field investigations would be necessary during the advanced planning phase of the project. Implementation of a plan would result in overall beneficial environmental effects. The No Action Plan would result in the management of the refuge under the current water supply and conditions.

E. SOCIAL ANALYSIS

The social consequences of constructing and operating the plans would be positive due to the potential increase in wildlife use and subsequently public use. The local social environment is discussed in the Social Appendix.

F. POWER ANALYSIS

Pacific Gas and Electric (PG&E) serves the Los Banos WMA under the PA-1 rate schedule for agricultural users. A facility must be an authorized function of the CVP to receive project-use power. The authority to deliver CVP power to the refuge is currently being examined and will be detailed in the Rfuge Water Supply Planning Report. A more detailed discussion of project use power and wheeling agreements is provided in the Power Analysis section of Chapter IV B.

G. PERMITS

Construction activities would require several permits. Merced County would issue approvals to ensure that the existing drainage facilities would not be adversely effected. If additional water is transferred through the California Aqueduct, approvals from

TABLE IV I-5
WILDLIFE RESOURCES
LOS BANOS WMA

Ducks

Pintail(a)
Gadwall(a)
Ring-necked Duck

Mallard(a)
Shoveler(a)
Canvasback

Green-winged Teal
Cinnamon Teal(a)
Ruddy Duck(a)
Widgeon

Geese and Swans

Ross Goose
Snow Goose

Cackling Goose
Whistling Swan

White-fronted Goose

Coots

American Coot(a)

Shore and Wading Birds

Pied-billed Grebe
White-faced Ibis
Lesser Sandhill Crane
Common Snipe
Long-billed Curlews
Great Blue Heron
Common Egrets

Snowy Egrets
American Bittern
Black-crowned Night Herons
American Avocet
Black-necked Stilt(a)
Dowitchers

Great Yellowlegs
Sandpiper
Killdeer(a)
Rail(a)
Sora(a)
Gallinule(a)

Upland Game

Pheasant(a)
Cotton Tail Rabbits

Black-tailed Jack Rabbits
Dove

TABLE IV I-5
WILDLIFE RESOURCES
LOS BANOS WMA
(Continued)

Raptorial Birds		
Marsh Hawk ^(a) White-tail Kite ^(a) Sparrow Hawk ^(a)	Red-tailed Hawk ^(a) Cooper's Hawk Golden Eagle	American Kestrel Turkey Vulture
Fish		
Brown Bullhead Threadfin Shad	Channel Catfish Carp	Striped Bass Large Mouth Bass
Furbearers		
Coyotes Opossum Beaver Spotted Skunk	Muskrats Striped Skunk Mink	Raccoon Grey Fox Badger

Notes:

(a) Birds nesting on refuge

Source: Environmental Assessment Reports, Los Banos Wildlife Area, and Refuge records

TABLE IV I-6

LISTED, PROPOSED, & CANDIDATE, THREATENED & ENDANGERED SPECIES

LOS BANOS WMA

Listed Species

None

Proposed Species

None

Candidate Species

Birds

Swainson's hawk, Buteo swainsoni (2)
Tricolored blackbird, Agelaius tricolor (2)
White-faced ibis, Plegadis chihi (2)

Plants

Hispid bird'-beak, Cordylanthus mollis subsp. hispidus (2)
Delta coyote-thistle, Eryngium racemosum (1)
Bearded allocarya, Plagiobothrys hystriculus (2)
Valley spearscale, Atriplex patula subsp. spicata (2)

Source: USFWS, June 4, 1987

- (E)—Endangered (T)—Threatened (CH)—Critical Habitat
(1)—Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.
(2)—Category 2: Taxa for which existing information indicated may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

TABLE IV I-7
WILDLIFE RECREATIONAL BENEFITS AND RESOURCE IMPACTS
LOS BANOS WMA

Item	Water Delivery Levels			
	Level 1	Level 2	Level 3	Level 4
Habitat Acres				
Permanent Water	100	484	484	600
Watergrass	0	500	700	850
Aquatics	0	0	200	300
Native Marsh	0	1,500	1,200	1,000
Un-irrigated				
Native Marsh	1,000	0	0	0
Uplands	2,108	724	624	458
Bird Use Days				
Coots	200,000	1,000,000	1,000,000	1,000,000
Ducks	4,000,000	12,000,000	12,000,000	14,500,000
Geese	1,000,000	2,500,000	2,500,000	2,500,000
Cranes	1,000	18,000	19,000	19,000
Wading Birds	80,000	250,000	300,000	350,000
Shorebirds	2,000,000	8,000,000	8,500,000	8,500,000
Public Use Days				
Consumptive	750	3,500	4,500	5,500
Non-Consumptive	7,500	20,000	21,000	22,500
Annual Recreational Benefits	\$ 178,700	\$ 509,010	\$ 552,330	\$ 606,480

